

a/ --44. The light modulating apparatus according to claim 43, wherein the light-modulating apparatus comprises a cholesteric display having a temperature independent reflective wavelength.--

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**REMARKS**

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Claims 18-44 are pending in the application as a result of the instant Amendment. It is respectfully submitted that claims 1-17 were cancelled in favor of claims 18-44 to put the claims into the form preferred in U.S. practice; the new claims do not add new matter to the instant application.

It is respectfully submitted that the Preliminary Amendment places the above-identified application in better condition for initial examination.

A clean copy of claims 18-44 is provided in the attached Appendix.

If any points remain in issue which the Examiner feels may best be resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,



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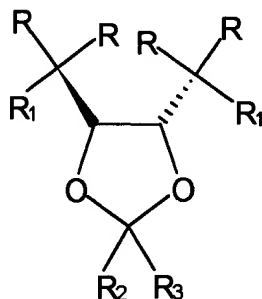
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Date: September 24, 2001

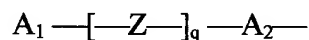
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## APPENDIX

18. An optically active compound of the formula:

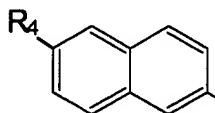


where the  $R_2$  and  $R_3$  groups are methyl, another lower alkyl group or an aryl or biaryl unit while the  $R_1$  groups independently each are a hydroxyl, alkoxyl, aryloxy, or arylalkoxy group, the  $R$  groups each represent a group as follows:

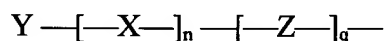


where  $A_1$  is an aromatic group, an acyclic aliphatic group, or an alicyclic group, and  $A_1$  can be a substituted or unsubstituted group,  $Z$  is a group selected from  $-O-$ ,  $-OCO-$ , or  $-S-$ , and the coefficient  $q$  is 0 or 1.  $Z$  may also be  $(CH_2)_nO$  where the coefficient  $n$  is 0 to 5 and the coefficient  $q$  is 1.  $A_2$  is a bivalent radical of a naphthalene group, and the cyclic structure of  $A_2$ , or  $A_1$  if it is cyclic, optionally can be heterocyclic, such as by replacement of one or more  $CH$  member(s) of the ring structure with  $N$ ,  $O$  and/or  $S$ .

19. The optically active compound of claim 18, where each  $R$  substituent is independently selected as:



where  $R_4$  represents a group as follows:

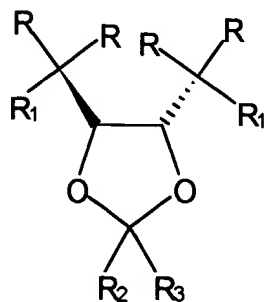


where  $n$  is an integer value of 0 or 1 or more,  $X$  is  $-\text{CH}=\text{CH}-\text{CH}_2-$ , or  $-(\text{CH}_2)_m-$  where  $m$  is an integer value of 1, 2, 3, or more,  $Y$  is a radical of an aromatic hydrocarbon, an acyclic aliphatic hydrocarbon, or an alicyclic hydrocarbon, and  $Y$  can be a substituted or unsubstituted group, and  $Z$  and  $q$  have the same respective meanings as defined in claim 18.

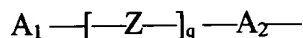
20. The optically active compound of claim 19, where  $R_4$  is an aryloxy radical, an arylalkoxy radical, an arylalkyleneoxy, or an arylalkenyleneoxy radical.

21. (4R,5R)-2,2-dimethyl- $\alpha,\alpha,\alpha',\alpha'$ -tetrakis[6-(benzyloxy)naphth-2-yl]-1,3-dioxolane-4,5-dimethanol.

22. A liquid crystalline mixture, comprising:  
a liquid-crystalline base having liquid crystalline properties;  
at least one optically active compound of the formula:

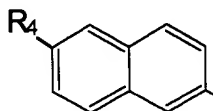


where the  $R_2$  and  $R_3$  groups are methyl, another lower alkyl group or an aryl or biaryl unit while the  $R_1$  groups independently each are a hydroxyl, alkoxyl, aryloxy, or arylalkoxy group, the R groups each represent a group as follows:

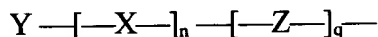


where  $A_1$  is an aromatic group, an acyclic aliphatic group, or an alicyclic group, and  $A_1$  can be a substituted or unsubstituted group, Z is a group selected from -O-, -OCO-, or -S-, and the coefficient q is 0 or 1. Z may also be  $(CH_2)_nO$  where the coefficient n is 0 to 5 and the coefficient q is 1.  $A_2$  is a bivalent radical of a naphthalene group, and the cyclic structure of  $A_2$ , or  $A_1$  if it is cyclic, optionally can be heterocyclic, such as by replacement of one or more CH member(s) of the ring structure with N, O and/or S.

23. The liquid crystalline mixture of claim 22, where each R substituent is independently selected as:



where  $R_4$  represents a group as follows:



where n is an integer value of 0 or 1 or more, X is  $-CH=CH-CH_2-$ , or  $-(CH_2)_m-$  where m is an integer value of 1, 2, 3, or more, Y is a radical of an aromatic hydrocarbon, an acyclic aliphatic hydrocarbon, or an alicyclic hydrocarbon, and Y can be a substituted or unsubstituted group, and Z and q have the same respective meanings as defined in claim 18.

24. The liquid crystalline mixture of claim 23, where  $R_4$  is an aryloxy radical, an arylalkoxy radical, an arylalkyleneoxy, or an arylalkenyleneoxy radical.

25. The liquid crystalline mixture according to claim 22, further including an achiral non-liquid crystalline compound.

26. The liquid crystalline mixture according to claim 25, wherein the achiral non-liquid crystalline compound comprises  $R^1-C\equiv N$ , where  $R^1$  represents an aliphatic group.

27. The liquid crystalline mixture according to claim 26, wherein  $R^1-C\equiv N$  comprises an alkylnitrile.

28. The liquid crystalline mixture according to claim 26, wherein  $R^1-C\equiv N$  comprises undecanenitrile.

29. A liquid crystalline mixture, comprising:

a liquid-crystalline base having liquid crystalline properties;

at least one optically active compound of the formula (4R,5R)-2,2-dimethyl- $\alpha,\alpha,\alpha',\alpha'$ -tetrakis[6-(benzyloxy)naphth-2-yl]-1,3-dioxolane-4,5-dimethanol.

30. The liquid crystalline mixture according to claim 29, further including an achiral non-liquid crystalline compound.

31. The liquid crystalline mixture according to claim 30, wherein the achiral non-liquid crystalline compound comprises  $R^1-C\equiv N$ , where  $R^1$  represents an aliphatic group.

32. The liquid crystalline mixture according to claim 31, wherein  $R^1-C\equiv N$  comprises an

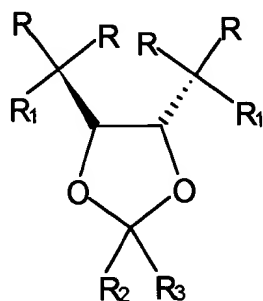
alkylnitrile.

33. The liquid crystalline mixture according to claim 31, wherein  $R^1-C\equiv N$  comprises undecanenitrile.

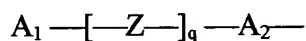
34. An electro-optical cell comprising a layer including a liquid crystalline mixture sandwiched between two substrate means, and means for applying an electric potential to the substrate means, wherein the liquid crystalline mixture comprises:

a liquid-crystalline base having liquid crystalline properties;

at least one optically active compound of the formula:



where the  $R_2$  and  $R_3$  groups are methyl, another lower alkyl group or an aryl or biaryl unit while the  $R_1$  groups independently each are a hydroxyl, alkoxyl, aryloxy, or arylalkoxy group, the  $R$  groups each represent a group as follows:



where  $A_1$  is an aromatic group, an acyclic aliphatic group, or an alicyclic group, and  $A_1$  can be a substituted or unsubstituted group,  $Z$  is a group selected from  $-O-$ ,  $-OCO-$ , or  $-S-$ , and the coefficient  $q$  is 0 or 1.  $Z$  may also be  $(CH_2)_nO$  where the coefficient  $n$  is 0 to 5 and the coefficient  $q$  is 1.  $A_2$  is a bivalent radical of a naphthalene group, and the cyclic structure of  $A_2$ , or  $A_1$  if it is cyclic, optionally can be heterocyclic, such as by replacement of one or more  $CH$  member(s) of the ring structure with

N, O and/or S.

35. A light modulating apparatus comprising an electro-optical cell according to claim 34.

36. The light modulating apparatus according to claim 35, wherein the light modulating apparatus comprises a cholesteric display.

37. An electro-optical cell comprising a layer including a liquid crystalline mixture sandwiched between two substrate means, and means for applying an electric potential to the substrate means, wherein the liquid crystalline mixture, comprises:

a liquid-crystalline base having liquid crystalline properties;

at least one optically active compound of the formula (4R,5R)-2,2-dimethyl- $\alpha,\alpha,\alpha',\alpha'$ -tetrakis[6-(benzyloxy)naphth-2-yl]-1,3-dioxolane-4,5-dimethanol.

38. A light modulating apparatus comprising an electro-optical cell according to claim 37.

39. The light modulating apparatus according to claim 38, wherein the light modulating apparatus comprises a cholesteric display.

40. An electro-optical cell comprising:

a layer comprising:

at least 70 weight percent (wt%) nematic host mixture; and

at least about 2 wt% (4R,5R)-2,2-dimethyl- $\alpha,\alpha,\alpha',\alpha'$ -tetrakis[6-(benzyloxy)naphth-2-yl]-1,3-dioxolane-4,5-dimethanol;

first and second substrates disposed above and below, respectively, the layer; and

first and second conductors physically coupled to the first and second substrates, respectively, which permit an electrical potential to be applied across the layer.

41. The electro-optical cell as recited in claim 40, wherein the layer further comprises about 2-6 wt% achiral material.

42. The electro-optical cell as recited in claim 40, wherein the layer further comprises a chiral material different from (4R,5R)-2,2-dimethyl- $\alpha,\alpha,\alpha',\alpha'$ -tetrakis[6-(benzyloxy)naphth-2-yl]-1,3-dioxolane-4,5-dimethanol and having an opposite twist sense.

43. A light modulating apparatus comprising an electro-optical cell according to claims 40.

44. The light modulating apparatus according to claim 43, wherein the light-modulating apparatus comprises a cholesteric display having a temperature independent reflective wavelength.